How Should be the Education Before the Urological Laparoscopic Surgery?

Ürolojik Laparoskopik Cerrahi Öncesi Eğitim Nasıl Olmalı?

Laparoscopic Urological Surgery Training

Adem Altunkol, Deniz Abat, Mehmet Eflatun Deniz, Zafer Gökhan Gürbüz
Department of Urology, University of Health Sciences, Adana Numune Teaching and Research Hospital, Adana, Turkey

Öz

Amaç: Çalışmamızda önce izleyip sonra kuru kutu ve deney hayvanları üzerinde çalıştıktan sonra laparoskopi deneyimi olan cerrahlar gözetiminde yapılan ilk laparoskopik cerrahi prosedürlerin etkinlik ve güvenliğini değerlendirmeyi amaçladık. Gereç ve Yöntem: Tek cerrahın (A.A) laparoskopik eğitimi sonrası Mayıs 2015 ile Eylül 2016 tarihleri arasında yapmış olduğu 21 laparoskopik cerrahi prosedürün verileri, dosya ve bilgisayar kayıtlarından retrospektif olarak elde edilip değerlendirilmiştir. Bulgular: Çalışmamıza dahil edilen hastaların 13'ü kadın 8'i erkek olup yaş ortalaması 53±18 yıl ve vücut kitle indeksleri 27,9±3,67 kg/m2 idi. Ortalama operasyon süresi 157,76±51,14 dakika olup ortalama sonda ve dren çekilme süreleri sırasıyla 18,1±7,2 saat, 42,1±14,7 saat olarak tespit edildi. Total komplikasyon oranı %4,76 idi. Vakaların biri hariç hiçbirinde açık cerrahiye geçilmedi ve kan transfüzyon ihtiyacı duyulmadı. Tartışma: Temel teorik eğitim, kuru laboratuvar ve hayvan üzerindeki çalışma sonrası uygun hasta seçimi ve laparoskopi tecrübesi olan cerrah gözetiminde yapılan cerrahilerle laparoskopiye başlanılması eğitim sürecini hızlandıracağı, komplikasyonları önemli ölçüde azaltacağı ve cerrahin kendine olan güvenini arttıracağı kanaatindeyiz.

Anahtar Kelimeler

Laparoskopi; Öğrenim Eğrisi; Tecrübe

Abstract

Aim: In our study we aimed to evaluate the efficiency and the safety of the first laparoscopic surgical procedures of a surgeon, completed under the observation of surgeons with laparoscopic experience, following experience with training boxes and animals. Material and Method: After the laparoscopic education of the single surgeon (A.A.) in this study, the data of 21 laparoscopic surgical procedures he performed between May 2015 and Sep 2016 were taken retrospectively from the files and computer databases and evaluated. Results: A total of 21 laparoscopic surgeries were performed by the surgeon on 13 women and 8 men. The mean age was 53±18 years and the mean body mass index (BMI) was 27.9±3.67 kg/m2. The average length of operation was 157.76±51.14 minutes, the average periods of urethral catheter and drainage catheter removal were 18.1±7.2 hours and 42.1±14.7 hours, respectively. The overall complication percentage was 4.76%. Except in one case, it was not necessary to move the patient to open surgery or to perform blood transfusion. Discussion: We concluded that appropriate patient selection and a training that begins with basic theorical education, work dry training box in the laboratory, work with test animals, and finally performance of laparoscopic surgeries under the observation of experienced surgeons, will accelerate the education process, greatly reduce complications, and increase the self-confidence of the surgeon.

Keywords

Laparoscopy; Learning Curve; Experience

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Corresponding Author: Adem Altunkol, Department of Urology, University of Health Sciences, Adana Numune Teaching and Research Hospital, Adana, Turkey.
GSM: +905076074572 E-Mail: ademaltunkol@hotmail.com

Introduction

Laparoscopic technique is a minimally invasive approach used in many surgical operations. There is a tendency toward laparoscopic surgery because it provides for shorter hospital stays, has better cosmetic results, allows patients to return more quickly to their daily lives, has a lower morbidity, reduces blood loss and postoperative pain, and its treatment results are as effective and safe as open surgery [1, 2]. After transperitoneal laparoscopic nephrectomy was first performed by Clayman et al., a historical turning point in laparoscopy, laparoscopy has become the gold standard and the number of procedures has increased significantly. However, it is necessary to complete a time-consuming learning curve to reach a certain level of competence by repeating some surgical procedures to develop the necessary hand skill [3, 4]. In many studies, it has been shown that theoretical and practical training programs, including manual or virtual simulators and animal laboratories, are effective before beginning laparoscopic operations [5].

In this study, we aimed to evaluate the efficacy and safety of the first laparoscopic operations performed under the supervision of surgeons who are experienced in laparoscopic surgery, after training that included observation, work on the dry box, and work with experimental animals.

Material and Method

Twenty-one laparoscopic surgical procedures were performed between May 2015 and September 2016 by a single surgeon (A.A.), who had previously participated in a laparoscopic training program. The data of all training programs and surgical procedures were retrospectively obtained from files and computer records. The surgeon began his training in laparoscopic operations as an assistant in the final four years of his specialization training, where he completed his basic education. In the clinic where he worked after the specialization training, he participated in many cases as an assistant and took an active role in some cases. Also during the post-specialization period, he participated in the regional live laparoscopic surgery course, two international laparoscopy congresses and symposiums, two national laparoscopy courses, and finally the laparoscopic urological surgery course (on pigs). In this process, he also continued his laparoscopy education studies using a training box. In our study, we evaluated and discussed the first laparoscopic surgical procedures completed by A.A., performed under supervision of surgeons experienced with laparoscopy, in terms of patient age, duration of operations, number of ports, catheter and drain withdrawal times, and complications.

Results

The patients were evaluated preoperatively with blood tests, urine cultures, and imaging. Surgery for patients with preoperative active infections was delayed until the end of medical treatment. Of the patients included in the study, 13 were female and 8 were male, the mean age was 53±18 years and the mean BMI was 27.9±3.67 kg/m2. The mean duration of the operations was 157.76±51.14 minutes and the mean catheter and drain withdrawal times were 18.1±7.2 hours and 42.1±14.7 hours, respectively. Only one patient was moved to open surgery and no patient needed a blood transfusion. In the postoperative period, elderly patients were followed for a short time in the surgical intensive care unit for hemodynamic monitoring. Iliac artery injury was seen in the patient moved to open surgery during laparoscopic ureterolithotomy. This patient was urgently consulted in the department of cardiovascular surgery and the artery was repaired primarily and subsequently the ureteral stone was removed via open surgery. The difficulty level of all the surgeries was classified according to the European Scoring System, shown in Table.

Table. Evaluation of Operations according to European Scoring System

Laparoscopic Surgical Operations	Number and Percents (n/%)	Level of Global Difficulty
Laparoscopic Renal Cyst Excision	8 (38,09 %)	Easy
Laparoscopic Orchiopexy	1 (4,7 %)	Slightly Difficult
Laparoscopic Ureterolithotomy	4 (19,04 %)	Slightly Difficult
Laparoscopic Adrenalectomy	1 (4,7 %)	Fairly Difficult
Laparoscopic Simple Nephrectomy	6 (28,57 %)	Fairly Difficult
Laparoscopic Radical Nephrectomy	1 (4,7 %)	Difficult

Discussion

Surgeons learn laparoscopic technique and gain experience and skills thanks to simulators, training boxes, and by working with cadavers and animals. Although simple laparoscopic training boxes and simulators provide training to a similar level of ability, it is important that it is done under the supervision of a surgeon experienced in laparoscopic surgery, to be able to perform the laparoscopy properly and accurately.

At the beginning of training in laparoscopy, the equipment, hand tools, and energy sources must be learned carefully. In the next step, knotting techniques, controlling the hand tools, and hand-eye coordination exercises are practiced. In further laparoscopy training, intracorporeal suture and knotting techniques and animal or cadaver surgery training should be undertaken. It is especially important that coagulation, dissection, and cutting techniques are developed during this process. At the same time, basic training can be accelerated with the use of monitors, insufflators, cameras, and video recorders. Then, performing an easy operation and completing the surgery from start to end under the supervision of an experienced surgeon is an indispensable element of the training, especially in developing self-confidence. As a final step, the trained surgeon must perform surgery independently. Laparoscopic training program models in Turkey consist of visual training equipment, theoretical training starting with printed materials, animal laboratory, a fellowship program, assisting a surgeon experienced in laparoscopy, and finally performing surgery alone, under close supervision [7,8]. The period of time required for the surgeon to make and develop these techniques is known as “the learning curve.” The learning curve can be defined as a high number of repetitions of procedures to reach the plateau in high-quality expertise and excellence [5].

In the study of Vlaovic et al. where the development of basic laparoscopic skills was evaluated after five days of intensive training, they reported a significant improvement in laparoscopic and robotic skills [9].

However, Hogle et al. reported that students could not reach

the plateau level in coordination, navigation, holding, hooking, and cutting and clamping operations with laparoscopic simulator tools after 7 to 8 sessions of training [10]. Although failure to reach the desired plateau with short training periods is not very different in our country, we think that this process will accelerate in surgeons with no experience of laparoscopy, thanks to studies conducted with recurrent trainings on training boxes. Working with the training box during the beginning stages of laparoscopy training seems enjoyable and fun but is actually a difficult process with fine details that require patience. Furthermore, even when training is complete, the first surgery can produce undesirable outcomes. No matter how many times simulators and training boxes are used, there is a need for a surgeon experienced in laparoscopic surgery to closely supervise the inexperienced surgeon during the actual operation. In the review of Akın et al., it was emphasized that expert supervision has an important role in accelerating the learning curve and in reducing laparoscopic complications [11].

The laparoscopy learning curve is generally evaluated by assessing the duration of operations and complication rates [12]. It has been reported that gaining experience in laparoscopy, choosing appropriate patients, and completing preoperative preparations of patients before surgery are important in reducing and preventing complications [13]. It has been suggested that at least 50 difficult cases must be performed to gain adequate laparoscopy skills [14]. In the literature, there are numerous studies reporting an overall complication rate of 4.4% to 22.1% [15]. Because of the diversity of cases in our study, the mean duration of operation cannot offer homogeneous information to measure the laparoscopic learning curve. However, as reported in the table, we observed a complication rate of 4.76% for slightly difficult or difficult cases, similar to the lowest rates in the literature. We think because the fact that A.A. performed surgery under the supervision of a surgeon with laparoscopy experience after fully completing laparoscopy training contributed to this low rate. The supervising surgeon can maintain control in the surgical field and can train the surgeon to recognize organs and to detect important anatomical points. In our study, A.A. completed these training sessions and started surgery under the supervision of an expert (Z.G.G. or D.A.) who had experience in laparoscopic surgery. This allowed A.A. to improve rapidly in the recognition of the anatomical landmarks with the intracorporeal image of the organs. In the patient who underwent ureterolithotomy, there was no complication except switching to open surgery, and all operations were completed in the durations close to those reported in similar studies. We attributed the one complication to inadequate patient choice for the new surgeon.

Another study reported that cases with upper urinary tract cancer treated laparoscopically by a surgeon at the beginning of the learning curve had similar outcomes to those of non-oncological cases in terms of the duration of the operations, hospital stays, and postoperative complications. The conclusion was that laparoscopy can be performed at the beginning of the learning curve for such cases. It has been emphasized that very difficult procedures such as radical cystectomy and radical prostatectomy should be performed by a surgeon who has reached a certain level of experience [2]. In our study, when we compared the results of the patient with radical nephrectomy with those of other non-oncologic patients, we observed similar results in terms of the duration of operations, hospital stays and complications. With these results, we concluded that laparoscopic technique can be applied to the appropriate oncologic cases. The fact that few case studies are presented with one surgeon, is a limitation of our study. Perhaps if we had more laparoscopic surgeries or there was no supervision by surgeons experienced with laparoscopy, the number of complications would be significantly higher [12].

Consequently, we believe that starting laparoscopy under the supervision of a surgeon with the experience of laparoscopy, with appropriate patient selection and after basic theoretical education, dry training box laboratory, and study on animals will accelerate the training process, reduce complications significantly, and increase the self-confidence of the surgeon.

Competing interests

The authors declare that they have no competing interests.

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